SERVICE MANUAL
for the
WELCH ALLYN
LX-150 LIGHT SOURCE
no.'s 45150,45250 (after 8/91),
45160, 45262, 45264, 45266, 45268

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REV A
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LX-150
TABLE OF CONTENTS

FORWARD - i

SAFE SERVICE - ii

INDEX: FAILURE/CAUSE - 1 - 3

DIFFERENCES BETWEEN EARLY AND LATE MODELS - - - - - - - - - - - 3

INDEX: REMOVAL/REPLACEMENT (R & R) PROCEDURES - - - - - - 4

REMOVAL/REPLACEMENT PROCEDURES - - - - - - - - - - - - - - - - - 5 - 19

APPENDIX

SERVICE PARTS LIST AND EXPLODED DIAGRAM * * * * AA

WIRING DIAGRAM/SCHEMATIC DIAGRAM * * * * BB

REPAIR VERIFICATION TEST PROCEDURES * * * * CC

SET-UP AND OPERATION (OWNER'S MANUAL) * * * * DD

TOOLS (COMMON & SPECIAL) * * * * EE

PRODUCT UP-DATES * * * * FF

PRODUCT DESCRIPTION * * * * GG

FORWARD

THIS MANUAL IS FOR WELCH ALLYN TECHNICIANS WHO ARE TRAINED AND QUALIFIED TO PERFORM ELECTRICAL REPAIRS.

This manual provides technical assistance to Welch Allyn repair technicians for cleaning, disinfecting, diagnosing, repairing, and testing the WELCH ALLYN LX-150 LIGHT SOURCE. The manual's main content areas cover: faults/causes, step by step removal and replacement of parts, and re-test.

The repair 'TASK' procedures (R & R .. Removal and Replacement) are written to provide quick and easy reference for different experience levels of repair technician. Required specifications and materials are listed at each step where applicable. When reading this manual for the first time, have an LX-150 readily available for reference and practice. Read each complete repair step on what to do (task statement), plus how to do it (technique statement) before starting the repair or practice.

Training for the LX-150 should consist of detailed demonstrations of required repair tasks, practice using repair tooling and materials, and assessment of skill development through observation of trainee practice on actual equipment. Set up sessions to allow the trainee to practice the use of the diagnostic, repair, adjustment, and re-testing procedures found in this manual. The ability of the technician to develop and retain new skills is in great part dependent on well prepared training exercises. Each trainee must have the opportunity to practice the procedure(s) after it has been demonstrated by the instructor. More detailed background product information is found in the APPENDIX section and as such will be a critical element in a comprehensive service training program for technicians.

I M P O R T A N T :

Welch Allyn part numbers and 'M' (material) numbers appearing in this manual are for the purpose of familiarizing new technicians with Welch Allyn documentation conventions. Order replacement parts, as always, by referencing your latest bill of materials, parts catalog and assembly drawings. Part number changes, product updates, or new test procedures should be noted on the appropriate page of this manual by the manual owner. Notices announcing these changes should be attached to Appendix FF, PRODUCT UPDATES.

HOW TO FIND CURRENT PART NUMBER INFORMATION:

REFER TO THE MOST RECENT ASSEMBLY DRAWING(S) FOR APPLICATION INFORMATION ON PARTS, PROCESS, AND MATERIALS. FIND THE CURRENT PART NUMBERS BY REFERRING TO THE CIRCLED NUMBERS ('BUBBLE' NUMBERS) ON CURRENT ASSEMBLY DRAWINGS. FIND CORRESPONDING PART NUMBER ON THE MANUFACTURING OR REPAIR BILL OF MATERIALS.

*** SAFE SERVICE ***

WEAR approved eye protection when servicing this product.

CLEAN AND DISINFECT as per normal operating procedure **BEFORE** repairing, or adjusting all returned LX-150's. **NEVER ASSUME IT HAS BEEN DONE!! WIPE** unit off with solution of 10% Clorox, 90% water.

DISCONNECT power cord from A.C. power source before cleaning or disassembling LX-150. **LET** hot lamps cool before replacing them.

DO NOT OPERATE ANY UNITS UNTIL YOU HAVE DISASSEMBLED THEM AND DETERMINED THAT THEY ARE SAFE TO TEST/OPERATE. **VERIFY** that the circuits are same as appropriate assembly drawings circuits before energizing the LX-150 Light Source.

COMPLY with all safety codes and practices for this product.

PERFORM recommended Welch Allyn test procedures AFTER SERVICING to assure safe and reliable product operation, ie: ground continuity testing, dielectric strength testing, leakage current testing, and air pump output pressure testing.

EXAMINE AND REPAIR OR REPLACE as required, any and all worn or questionable wiring, components, connections, connectors, warning labels, insulation and other items necessary for the continued safe operation of this product.

DO NOT TOUCH halogen lamps or nearby parts during or immediately after operation. **WAIT 20 MINUTES!** High temperatures can cause severe burns. Fractured or broken lamps may cause injury. Use a cloth or other protection when removing questionable lamps.

DO NOT LOOK DIRECTLY AT halogen lamps during operation.

*** QUALITY SERVICE ***

MODIFY your Repair & Training Manual frequently by notating changes and revisions of part numbers and procedures. Enter this new data on the appropriate page and put the notice in Appendix FF.

READ AND UNDERSTAND customer comments and complaints on accompanying documentation (P.O. or other correspondence).
IF AN INJURY OR ILLNESS TO PATIENT OR USER, OR HAZARDOUS MALFUNCTION HAS OCCURRED OR IS SUSPECTED, DO NOT DISASSEMBLE, REASSEMBLE, ALTER OR REPAIR THE PRODUCT IN ANY WAY...INSTEAD, GIVE THE UNIT AND ALL ACCOMPANYING PAPERWORK TO YOUR REPAIR SUPERVISOR. Appropriate action per approved Welch Allyn policy will be taken.

OPEN the light source and perform complete inspection. **LOOK** for: product defects, damage, tampering, unsafe condition of wiring or any component. **ENTER** findings and test data along with repair status in the appropriate file.

INDEX OF FAILURES / CAUSES

SEE SCHEMATIC 451536,109P370, 451605 & ASSEMBLY DRAWINGS OF LX-150.

FAILURE or COMPLAINT:		POSSIBLE CAUSE & CORRECTIVE ACTION:
UNIT COMPLETELY INOPERATIVE (NO LIGHT, FAN, AIR when lamp door is closed)	...	not plugged in...PLUG IN TO MAINS
	...	no voltage at MAINS (AC OUTLET). CHECK and restore voltage.
	...	lamp access door ajar...LATCH DOOR.
	...	fuse(s) blown...CHECK FOR SHORT TO GROUND OR OTHER HIGH CURRENT DRAW CAUSE (LINE-TO-LINE SHORT.) RESTORE CIRCUIT TO SPECIFICATIONS BEFORE ENERGIZING UNIT. REPLACE FUSES, TEST.
	...	defective interlock switch...REPLACE
	...	bent interlock switch actuation arm...REPLACE WHOLE SWITCH.
	...	loose wire connection...RESTORE
	...	defective power switch S1...REPLACE
	...	defective power cord...REPLACE CORD
	...	unit miswired...COMPARE TO SCHEMATIC AND RESTORE CIRCUIT TO SPECIFICATION.
	...	interlock switch "normally closed" contacts used instead of required "normally open" contacts. CHECK AND RESTORE CORRECT CONNECTIONS.
FAN RUNS BUT NO LIGHT	...	lamp loose in holder...RESEAT LAMP
WARNING:: ALLOW LAMP TO COOL FOR 20 MINUTES BEFORE TOUCHING !!!	...	burned out lamp...CHECK OLD LAMP FOR CORRECT VOLTAGE RATING (21 V). REPLACE LAMP WITH WELCH ALLYN PN04050
	...	thermal protector over heated (above 95 degrees C)...LET COOL
	...	thermal protector cooled and stuck open...REPLACE THERMAL PROTECTOR
	...	open transformer winding...REPLACE
	...	lamp turns off after short time... wrong or defective thermal protector REPLACE THERMAL PROTECTOR.
	...	unit miswired...COMPARE TO SCHEMATIC AND RESTORE CIRCUIT TO SPECIFICATION.
LOW LIGHT OUTPUT	...	lamp not seated...RESEAT LAMP
	...	bad lamp...REPLACE LAMP
WARNING:: ALLOW LAMP TO COOL FOR 20 MINUTES BEFORE TOUCHING !!!	...	lower wattage lamp installed... REPLACE WITH PNO4050 150 WATT LAMP.
	...	low transformer secondary voltage...check wiring...REPLACE TRANSFORMER.
	...	unit miswired (wrong transformer tap used)...COMPARE TO SCHEMATIC AND RESTORE CIRCUIT TO SPECIFICATION.
	...	dirty reflector...CLEAN.
	...	shutter crank loose...ALIGN, TIGHTEN.

LX-150 INDEX OF FAILURES / CAUSES, CONTINUED.....

FAILURE OR COMPLAINT:		POSSIBLE CAUSE AND CORRECTIVE ACTION:
PUMP DOES NOT RUN	...	defective " AIR" switch...REPLACE.
	...	poor electrical connection to pump...RESTORE ELECTRICAL CONNECTION.
	...	defective pump...REPLACE PUMP.
	...	unit miswired...COMPARE TO SCHEMATIC AND RESTORE CIRCUIT TO SPECIFICATION.
PUMP RUNS, NO/LOW OUTPUT	...	loose water bottle cap...TIGHTEN.
	...	tubing off of connector(s)...RESTORE CONNECTION(S).
	...	tubing sharply bent..STRAIGHTEN TUBE.
	...	cracked panel mount connector... REPLACE PANEL MOUNT CONNECTOR.
	...	cracked water bottle cap air fitting REPLACE AIR FITTING ON WATER BOTTLE
-	...	wrong tubing connections...RESTORE
COOLING FAN INOPERATIVE	...	bad electrical connection...RESTORE.
	...	defective fan motor...REPLACE FAN.
	...	fan obstructed...CLEAR OBSTRUCTION.
	...	unit miswired...COMPARE TO SCHEMATIC AND RESTORE CIRCUIT TO SPECIFICATION.
SIGMOIDOSCOPE CONNECTOR DOES NOT PLUG IN ALL THE WAY	...	ball detente jammed in down position set screw too far in...LOOSEN SET SCREW AND FREE UP THE BALL DETENT.
SIGMOIDOSCOPE CONNECTOR DOES NOT STAY IN THE PORT	...	loose or missing ball detent or spring...TIGHTEN SET SCREW AND PUSH BALL INTO ITS HOLE TO CHECK FOR SPRING.REPLACE WORN/MISSING PART.
SHUTTER DOES NOT FUNCTION...		knob is loose...TIGHTEN KNOB SET SCREW.
	...	shutter crank is loose...TIGHTEN SHUTTER CRANK 4-40X1/4" SET SCREW.
	...	bushing is broken...REPLACE BUSHING.
BRIGHTNESS KNOB RATTLES	...	knob shaft is loose...INSTALL SPRING WASHER PN106142-1.
SWITCH(S) PRODUCES ARC OR FLASH WHEN ACTUATED	...	switch is defective or wiring connections are loose or intermittent REPLACE CONNECTORS AND OR SWITCH.
FAILS DIELECTRIC STRENGTH TEST A00166	...	transformer/power cord assembly defective...ISOLATE AND REPLACE.

FAILURE OR COMPLAINT:		POSSIBLE CAUSE AND CORRECTIVE ACTION:
FAILS GROUNDING CONTINUITY TEST A00172	...	faulty connection in grounding circuit between the power cord receptacle ground pin and the chassis. INSPECT AND TEST FOR GROUND CONTINUITY, RESTORE AND OR REPLACE FAULTY COMPONENT.
	...	if above inspection, test reveals good circuit, then fault possible in power cord assembly. REPLACE POWER CORD.

FAILS LEAKAGE CURRENT TEST A00170	...	possible defective component: transformer, pump, fan, cord assembly. ISOLATE AND TEST INDIVIDUAL COMPONENTS. REPLACE.

NOTE: LX-150 UNITS MANUFACTURED AFTER JUNE 1991 INCORPORATE FEATURES THAT DISTINGUISH THEM FROM MODELS MANUFACTURED PRIOR TO THAT DATE. MOST NOTABLE ARE THE FOLLOWING:

ITEM:	BEFORE 6/91:	AFTER 6/91:
POWER CORD.....	PERMANENTLY ATTACHED POWER CORD.	PLUG-IN TYPE
FUSES.....	FUSES MOUNTED INSIDE UNIT ON FUSE BLOCK.	EXTERNAL ACCESS AT POWER RECEPTACLE.
TRANSFORMER MOUNTING.....	TWO PHILLIPS HEAD SCREWS, TWO MACHINE SCREWS W/ 1/4" HEAD.	TWO PHILLIPS HEAD SCREWS, TWO TABS.
RUBBER FEET....	ADHESIVE	FASTENER
PNEUMATICS.....	"T" FITTING BETWEEN PANEL MOUNT CONNECTOR AND AIR PUMP.	PUMP OUTPUT GOES DIRECTLY TO PANEL MOUNT CONNECTOR.

T E C H N I C I A N N O T E S :

INDEX: REMOVAL AND REPLACEMENT (R & R) PROCEDURES

CAUTION : DISCONNECT LX-150 FROM A.C. POWER SOURCE BEFORE SERVICING TO AVOID ELECTRICAL SHOCK HAZARD

	Component:	Page:
A	Lamp	5
B.1	External fuses	6
B.2	Internal fuses	7
C	Power cord	8
D	Power cord receptacle	9
E	Power and air switches	10
F	Fan assembly	11
G	Lamp holder	12 - 13
H	Lamp holder/heat sink assy.	14
I	Air pump	15 - 16
J	Transformer	17
K	Interlock switch	18
L	Shutter adjustment	19

THIS MANUAL IS FOR AUTHORIZED WELCH ALLYN TECHNICIANS WHO ARE TRAINED AND QUALIFIED TO WORK ON ELECTRICAL EQUIPMENT. ALWAYS TEST TO VERIFY SAFE OPERATION.

CAUTION: DISCONNECT LX-150 FROM POWER SOURCE BEFORE SERVICING.

A HALOGEN LAMP REMOVAL AND REPLACEMENT (R & R) PN04050
(GE TYPE EJA 150 WATT 21 VOLTS)
D O N O T T O U C H H O T L A M P !

WARNING: ALLOW LAMP TO COOL OFF FOR 20 MINUTES BEFORE TOUCHING.

A 1. UNPLUG LX-150 AND OPEN LAMP ACCESS DOOR.

(**ALSO REFER** TO OPERATING INSTRUCTIONS PN451502.) **REMOVE** POWER CORD FROM A.C. POWER SOURCE. **UNCOUPLE** AIR INPUT HOSE AND **UNCLIP** WATER BOTTLE AND BRACKET FROM THE SIDE OF THE UNIT. **TURN** THE UNIT UPSIDE DOWN. **INSERT** A COIN IN THE SLOT OF THE LAMP-ACCESS-DOOR LATCH (SLOTTED SCREW HEAD ON THE SIDE OF THE DOOR OPPOSITE THE HINGE) AND **TURN** THE LATCH ONE QUARTER TURN COUNTER-CLOCKWISE. **OPEN** LAMP ACCESS DOOR.

D O N O T T O U C H H O T L A M P !

A 2. REMOVE LAMP.

AFTER COOLING DOWN PERIOD OF 20 MINUTES, **LOCATE AND PULL** THE LAMP HOLDING LEVER TO RAISE THE BASE OF THE LAMP OUT OF ENGAGEMENT WITH THE LAMP SOCKET AS SHOWN IN **FIG. A-1.** **PULL** THE LAMP HOLDING LEVER TOWARD THE BACK OF THE UNIT UNTIL LEVER IS ALMOST VERTICAL. **REMOVE** EXPIRED LAMP AS SHOWN IN **FIG. A-2.**

CAUTION: EXERCISE CAUTION IF THE LAMP REFLECTOR OR THE QUARTZ ENVELOPE ITSELF IS FRACTURED, CRACKED, OR HOT. USE A CLOTH TO HOLD THE OLD LAMP WHEN PULLING OLD LAMP OUT OF SOCKET. **DO NOT TWIST** LAMP...THIS WILL BREAK THE PINS FROM THE LAMP. IF THE LAMP HAS FRACTURED, **REMOVE** ALL FRAGMENTS FROM THE LX-150.

A 3. REPLACE WITH NEW LAMP PN04050.

RETURN THE LAMP HOLDING LEVER TO ITS ORIGINAL POSITION. AS SHOWN IN **FIG. A-3.** NOTE: HOLD THE LAMP ON THE OUTSIDE SURFACES ONLY. FINGER GREASE OR OTHER CONTAMINANTS WILL DARKEN THE QUARTZ ENVELOPE CAUSING DISCOLORATION AND PREMATURE FAILURE OF THE REPLACEMENT LAMP. **REMOVE** PROTECTIVE CAP FROM LAMP. **VERIFY** PROPER ALIGNMENT OF PINS IN LAMP SOCKET. **PRESS** DOWN INTO FULL ENGAGEMENT WITH LAMP SOCKET. SEE **FIG. A-4.** LAMP WILL SNAP INTO PLACE.

A 4. RESTORE LAMP ACCESS DOOR TO ORIGINAL CLOSED AND LATCHED POSITION.

CLOSE THE LAMP ACCESS DOOR AND **LATCH** THE FASTENER. THE INTERLOCK SWITCH HAS BEEN CLOSED BY THIS ACTION.

A 5. TEST TO VERIFY SAFE OPERATION.

PLACE LX-150 IN UPRIGHT POSITION AND **CONNECT** TO POWER SOURCE. LIGHT SHOULD COME ON. **ALLOW** NEW LAMP TO **OPERATE** AT LEAST FIVE MINUTES TO 'BURN IN'.

FIG. A-1

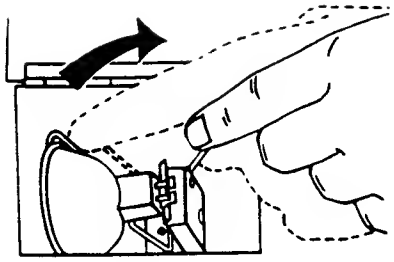


FIG.A-2

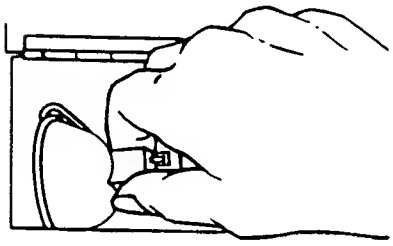


FIG.A-3

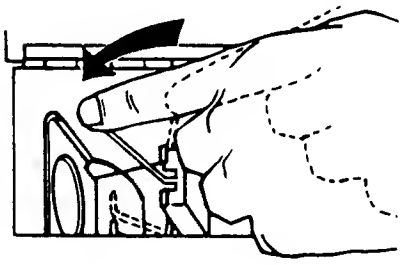
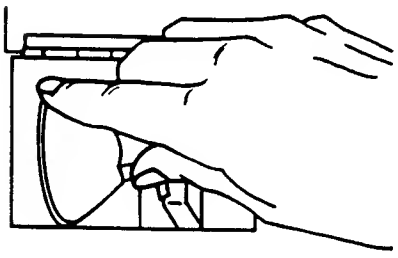


FIG.A-4



CAUTION: DISCONNECT LX-150 FROM POWER SOURCE BEFORE SERVICING.

B.1 NEWER UNITS .. EXTERNAL FUSES (TWO) R & R. SEE TABLE IN PARTS CATALOG FOR CORRESPONDING PART NUMBER.

CAUTION: FOR UNITS RETURNED FOR SERVICE BECAUSE OF BLOWN FUSES, OR RE-OCCURRING FUSE BLOWING, CHECK FOR SHORT TO GROUND OR OTHER HIGH CURRENT DRAW CAUSE (LINE-TO-LINE SHORT.) INSPECT WIRING AND COMPONENTS FOR BURN AND SMOKE MARKS, AND DAMAGED INSULATION. REPLACE FAULTY COMPONENTS AND RESTORE CIRCUIT TO SPECIFICATIONS BEFORE ENERGIZING UNIT. REPLACE FUSES AND OPERATE UNIT.

LOOK FOR:

1. **THE FAILURE OR DEFECT WHICH CAUSED THE FUSE TO BLOW.**
2. **THE CAUSE OF THE FAILURE.**
3. **OTHER DAMAGE THAT MAY HAVE BEEN DONE BEFORE THE FUSE BLEW.**

B.1 1. REMOVE FUSE DRAWER.

DISCONNECT LX-150 FROM POWER SOURCE. **REMOVE** POWER CORD FROM UNIT POWER CORD RECEPTACLE. **INSERT** THE FLAT BLADE OF A SMALL SCREWDRIVER (1/8") INTO SLOT ON EITHER SIDE OF FUSE DRAWER. **UN-LATCH** EACH SIDE OF THE FUSE DRAWER AND REMOVE.

B.1 2. REMOVE FUSES FROM FUSE DRAWER.

PULL BOTH FUSES FROM FUSE DRAWER AND INSPECT. **COMPARE** RATING ON END CAP TO CORRECT REPLACEMENT PART RATING. FUSES CAN BE CHECKED VISUALLY. A BLOWN FUSE WILL HAVE INFINITE RESISTANCE. ON DIGITAL V.O.M.'S SUCH AS BECKMAN METERS, THE SYMBOL "OL" (OPEN LEADS) INDICATES AN OPEN CIRCUIT, IN THIS CASE, A BLOWN FUSE.

B.1 3. INSTALL NEW FUSES IN FUSE DRAWER.

REPLACE FUSES IN MATCHED PAIRS EVEN WHEN ONE APPEARS TO BE GOOD. **ALIGN** THE TAB ON THE BOTTOM OF THE FUSE DRAWER WITH THE SLOT IN THE POWER CORD RECEPTACLE.
PRESS FUSE DRAWER INTO HOUSING.

B.1 4. TEST TO VERIFY SAFE OPERATION.

CONNECT LX-150 TO POWER SOURCE AND PERFORM FULL FUNCTION TEST.

T E C H N I C I A N N O T E S:

CAUTION: DISCONNECT LX-150 FROM POWER SOURCE BEFORE SERVICING.

B.2 OLDER UNITS ... INTERNAL FUSES (TWO) R & R. SEE TABLE IN PARTS CATALOG FOR CORRESPONDING PART NUMBERS.

CAUTION: FOR UNITS RETURNED FOR SERVICE BECAUSE OF BLOWN FUSES, OR RE-OCCURRING FUSE BLOWING, CHECK FOR SHORT TO GROUND OR OTHER HIGH CURRENT DRAW CAUSE (LINE TO LINE SHORT.) INSPECT WIRING AND COMPONENTS FOR BURN AND SMOKE MARKS, AND DAMAGED INSULATION. REPLACE FAULTY COMPONENTS AND RESTORE CIRCUIT TO SPECIFICATIONS BEFORE ENERGIZING UNIT. REPLACE FUSES AND OPERATE UNIT.

LOOK FOR:

1. **THE FAILURE OR DEFECT WHICH CAUSED THE FUSE TO BLOW.**
2. **THE CAUSE OF THE FAILURE.**
3. **OTHER DAMAGE THAT MAY HAVE BEEN DONE BEFORE THE FUSE BLEW.**

B.2 1. REMOVE UNIT COVER (ON ALL UNITS).

DISCONNECT LX-150 FROM POWER SOURCE. **UNCOUPLE** AIR INPUT HOSE AND **UNCLIP** WATER BOTTLE AND BRACKET FROM THE SIDE OF THE UNIT. **REMOVE** EIGHT (8) PHILLIPS HEAD SCREWS FROM THE SIDES OF THE UNIT. **REMOVE** ONE (1) PHILLIPS HEAD SCREW WITH ITS STAR WASHER (FOR ELECTRICAL GROUNDING OF THE ENTIRE CASE) FROM THE BACK OF THE UNIT.

B.2 2. REMOVE FUSES FROM FUSE BLOCK.

PULL BOTH FUSES FROM FUSE BLOCK AND INSPECT. **COMPARE** RATING ON END CAP TO CORRECT REPLACEMENT PART RATING. FUSES CAN BE CHECKED VISUALLY. A BLOWN FUSE WILL HAVE INFINITE RESISTANCE. ON DIGITAL V.O.M.'S SUCH AS BECKMAN METERS, THE SYMBOL "OL" (OPEN LEADS) INDICATES AN OPEN CIRCUIT, IN THIS CASE, A BLOWN FUSE.

B.2 3. INSTALL NEW FUSES IN FUSE BLOCK.

SECURELY INSERT A PAIR OF REPLACEMENT FUSES INTO THE RECEPTACLES IN THE FUSE BLOCK.

B.2 4. INSTALL COVER ON UNIT. (LOCKTITE IS NOT USED ON SCREWS)

CAREFULLY SLIDE THE COVER OVER CHASSIS. **ALIGN** HOLES IN COVER WITH SCREW HOLES IN CHASSIS. **REPLACE** EIGHT (8) PHILLIPS HEAD SCREWS ON THE SIDES OF THE UNIT. **REPLACE** ONE (1) PHILLIPS HEAD SCREW AND STAR WASHER ON THE BACK OF THE UNIT. THE STAR WASHER ESTABLISHES ELECTRICAL CONTINUITY BETWEEN THE GROUNDED CHASSIS AND THE COVER.

B.2 5. TEST TO VERIFY SAFE OPERATION.

CONNECT LX-150 TO POWER SOURCE AND PERFORM FULL FUNCTION TEST.

CAUTION: DISCONNECT LX-150 FROM POWER SOURCE BEFORE SERVICING.

C POWER CORD (for Pre 1991 units with permanently attached cords) R & R

C 1. REMOVE COVER.

DISCONNECT LX-150 FROM POWER SOURCE.
FOLLOW INSTRUCTIONS IN SECT **B.2-1 PG. 7** TO REMOVE COVER FROM UNIT.

C 2. REMOVE OLD POWER CORD.

UNSCREW GROUND WIRE FROM CHASSIS. **REMOVE** GROUND WIRE SCREW AND STAR WASHER. (STAR WASHER IS REQUIRED TO CREATE CONTINUITY BETWEEN RING TERMINAL AND CHASSIS. **SAVE** THIS WASHER FOR INSTALLATION BETWEEN RING TERMINAL AND CHASSIS WHEN REASSEMBLING UNIT.)
DISCONNECT POWER CORD CONNECTORS FROM THE FUSE BLOCK. **REMOVE** STRAIN RELIEF AND **PULL** OLD CORD OUT OF CHASSIS. **DISCARD** OLD CORD AND STRAIN RELIEF.

C 3. INSTALL NEW POWER CORD.

ATTACH STRAIN RELIEF TO CORD AND PASS THROUGH THE HOLE IN THE CHASSIS. **ORIENT** THE GROUND WIRE TOWARDS THE GROUND SCREW HOLE. **ATTACH** THE GROUND RING TERMINAL TO THE CHASSIS USING THE EXISTING SCREW WITH THE STAR WASHER BETWEEN THE RING TERMINAL AND THE CHASSIS. **TIGHTEN** GROUND SCREW. **SEE** ASSEMBLY DRAWING. **CONNECT** WHITE WIRE SPADE CONNECTOR (NEUTRAL WIRE) TO THE FUSE BLOCK TERMINAL THAT MATCHES THE BLUE WIRE. **CONNECT** BLACK WIRE SPADE CONNECTOR (LINE WIRE) TO THE FUSE BLOCK TERMINAL THAT MATCHES THE BROWN WIRE.

C 4. INSTALL COVER ON UNIT.

FOLLOW INSTRUCTIONS IN SECTION **B.2-4 PG 7** TO ATTACH THE COVER TO THE LX-150.

C 5. TEST TO VERIFY SAFE OPERATION.

CONNECT LX-150 TO POWER SOURCE AND PERFORM **GROUND CONTINUITY TEST** AND ALL OTHER TESTS.

T E C H N I C I A N N O T E S :

CAUTION: DISCONNECT LX-150 FROM POWER SOURCE BEFORE SERVICING.

D **POWER CORD RECEPTACLE (for POST 1991 units with detachable power cords) R & R**

D 1. **REMOVE COVER.**
DISCONNECT LX-150 FROM POWER SOURCE.
FOLLOW INSTRUCTIONS IN SECT **B.2-1 PG. 7** TO REMOVE COVER FROM UNIT.

D 2. **REMOVE OLD POWER RECEPTACLE.**
DISCONNECT THREE WIRES FROM THE TERMINALS ON THE BACK OF THE POWER RECEPTACLE. **DEPRESS** SIDE LATCHES ON THE RECEPTACLE TO ALLOW IT TO COME OUT OF THE CHASSIS CUTOUT. **DISCARD** OLD POWER RECEPTACLE WITH CONTAINED FUSE TRAY AND FUSES.

D 3. **INSTALL NEW POWER RECEPTACLE.**
ALIGN REPLACEMENT POWER RECEPTACLE WITH THE GROUND (CENTER) TERMINAL AT THE BOTTOM OF THE HOLE IN THE CHASSIS. **PRESS** RECEPTACLE INTO CHASSIS CUTOUT. **CONNECT** WIRES PER ASSEMBLY DRAWING. WHEN VIEWED FROM INSIDE THE CHASSIS, THE LEFT RECEPTACLE TERMINAL IS THE LINE TERMINAL.. **CONNECT** THE BROWN WIRE SPADE CONNECTOR TO THE LINE TERMINAL. THE RIGHT TERMINAL IS THE NEUTRAL TERMINAL...**CONNECT** THE BLUE WIRE SPADE CONNECTOR TO THE NEUTRAL TERMINAL. THE CENTER TERMINAL IS THE GROUND TERMINAL...**CONNECT** THE GREEN/YELLOW GROUND WIRE TO THE GROUND TERMINAL.

D 4. **INSTALL COVER ON UNIT.**
FOLLOW INSTRUCTIONS IN SECTION **B.2-4 PG 7** TO ATTACH THE COVER TO THE LX-150.

D 5. **TEST TO VERIFY SAFE OPERATION.**
CONNECT LX-150 TO POWER SOURCE AND PERFORM **GROUND CONTINUITY TEST** AND ALL OTHER TESTS.

T E C H N I C I A N N O T E S :

_____

_____

_____

_____

CAUTION: DISCONNECT LX-150 FROM POWER SOURCE BEFORE SERVICING.

E POWER AND AIR SWITCHES R & R

E 1. REMOVE COVER.

DISCONNECT LX-150 FROM POWER SOURCE.
FOLLOW INSTRUCTIONS IN SECT **B.2-1 PG. 7** TO REMOVE COVER FROM UNIT.

E 2. REMOVE OLD SWITCH(S). WEAR EYE PROTECTION!

DISCONNECT SPADE CONNECTORS FROM THE SWITCH TERMINALS. **CUT OFF** THREE SPRING CLIP RETAINERS ON THE BACK CORNERS OF THE SWITCH BODY TO ALLOW IT TO COME OUT OF THE CHASSIS CUTOUT. (TO CUT OFF CLIP RETAINERS ON THE SWITCH, **PLACE** FLUSH CUTTING DIAGONAL CUTTERS ON THE CORNER OF THE SWITCH AND **CUT** OFF THE CORNER WHERE THE SPRING CLIP IS MOLDED TO THE BODY OF THE SWITCH. IT IS NECESSARY TO CUT OFF AT LEAST THREE SPRING CLIPS TO EASE REMOVAL OF THE SWITCH.) **DISCARD** OLD SWITCH(S).

E 3. INSTALL NEW SWITCH.

ALIGN REPLACEMENT SWITCH WITH THE "O" SYMBOL AT THE BOTTOM OF THE CHASSIS CUTOUT. **PRESS** SWITCH INTO CHASSIS CUTOUT. **CONNECT** WIRES PER ASSEMBLY DRAWING.

E 4. INSTALL COVER OF UNIT.

FOLLOW INSTRUCTIONS IN SECTION **B.2-4 PG 7** TO ATTACH THE COVER TO THE LX-150.

E 5. TEST TO VERIFY SAFE OPERATION.

CONNECT LX-150 TO POWER SOURCE AND **OPERATE** SWITCHES. **PERFORM** ALL TESTS.

T E C H N I C I A N N O T E S :

_____

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_____

_____

CAUTION: DISCONNECT LX-150 FROM POWER SOURCE BEFORE SERVICING.

F **FAN ASSEMBLY R & R**
A FAN, WHICH WHEN ISOLATED FROM THE CIRCUIT, AND DOES NOT FUNCTION PROPERLY WHEN A PROTECTED POWER SOURCE SUPPLIES CORRECT VOLTAGE TO ITS WIRES, IS CONSIDERED TO BE DEFECTIVE.

F **1. REMOVE COVER.**
DISCONNECT LX-150 FROM POWER SOURCE.
FOLLOW INSTRUCTIONS IN SECT **B.2-1 PG. 7** TO REMOVE COVER FROM UNIT.

F **2. DISCONNECT FAN MOTOR WIRING.**
CUT WIRE TIES FROM THE PAIR OF WIRES OF THE FAN MOTOR. **DISCONNECT** FAN MOTOR SPADE CONNECTORS AT TRANSFORMER FOR NEW UNITS, AND AT TERMINAL STRIP #S 4 AND 8 FOR OLDER UNITS SO EQUIPPED.

F **3. REMOVE FAN.**
REMOVE THE THREE 5/16" NUTS AND BOLTS WHICH HOLD THE FAN HOUSING TO THE FAN/BAFFLE ASSEMBLY. **USE** 5/16" OPEN END WRENCH AND 1/4" FLAT BLADE SCREWDRIVER. **PULL** THE FAN WIRES THROUGH THE FAN/BAFFLE ASSEMBLY GROMMET AND **DISCARD** THE OLD FAN IF DEFECTIVE.

F **4. INSTALL REPLACEMENT FAN ASSEMBLY.**
POSITION REPLACEMENT FAN IN THE FAN/BAFFLE ASSEMBLY SO THAT THE ARROW ON THE FAN HOUSING IS POINTING AWAY FROM THE LAMP **AND** THE WIRES LEAVING THE FAN HOUSING ARE CLOSEST TO THE GROMMET IN THE FAN/BAFFLE ASSEMBLY. **PASS** WIRES OF REPLACEMENT FAN UNDER THE MOUNTING BOLT AND THROUGH GROMMET. **ATTACH** WIRES TO TRANSFORMER (OR TERMINAL STRIP IF SO EQUIPPED AT TERMINALS 4 AND 8).
APPLY LOCKTITE TO THE ENDS OF THE BOLTS. **SECURE** THE FAN IN PLACE WITH THE THREE ORIGINAL EQUIPMENT 5/16" NUTS AND BOLTS. **INSTALL** NEW WIRE TIES AS PER ASSEMBLY DRAWING.

F **5. INSTALL COVER ON UNIT.**
PERFORM INSPECTION TO VERIFY THAT THERE ARE NO OBSTRUCTIONS TO FAN ROTATION.
FOLLOW INSTRUCTIONS IN SECTION **B.2-4 PG 7** TO ATTACH THE COVER TO THE LX-150.

F **5. TEST TO VERIFY SAFE OPERATION.**
CONNECT LX-150 TO POWER SOURCE AND **TURN ON** TO OPERATE FAN. LAMP COOLING AIR WILL BLOW FROM FAN VENTS ON THE SIDE OF THE UNIT. **PERFORM** ALL TESTS.

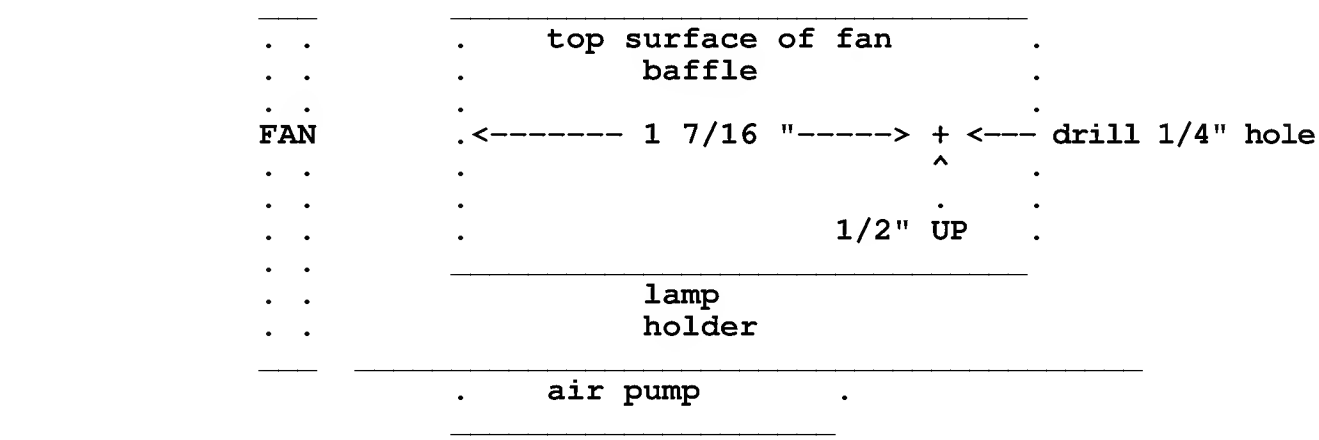
T E C H N I C I A N N O T E S :

CAUTION: DISCONNECT LX-150 FROM POWER SOURCE BEFORE SERVICING.

G **LAMP HOLDER R & R**

G **1. REMOVE COVER.**
DISCONNECT LX-150 FROM POWER SOURCE.
FOLLOW INSTRUCTIONS IN SECT **B.2-1 PG. 7** TO REMOVE COVER FROM UNIT.

G **2. LAYOUT FOR ACCESS HOLE DRILLING OPERATION.**
AN ACCESS HOLE WILL PERMIT EASY AND QUICK REMOVAL OF ONE OF THE TWO LAMP HOLDER FASTENERS. THE OTHER IS EASILY ACCESSIBLE. **CENTER PUNCH** AND **DRILL** 1/4" HOLE AT LOCATION ON FAN/BAFFLE AS SHOWN IN THE PLAN VIEW (TOP VIEW OF THE LX-150 LIGHT SOURCE WITH COVER REMOVED) BELOW. **USE** DRILL PRESS WITH 1/4" SHEET METAL DRILL BIT. **SET** DRILL DEPTH TO 1/8". **PROTECT** SCREW HEAD WITH SHIM STOCK UNDER THE AREA BEING DRILLED. **VACUUM AND SHAKE** ALL CHIPS OUT OF THE LX-150.



G **3. REMOVE OLD LAMP HOLDER FROM LAMP BRACKET.**
UNSCREW TWO 4-40 X 3/8" NUTS AND BOLTS.
CUT THE BUTT SPLICE OUT OF THE CIRCUIT. **DISCONNECT** LAMP LEADS FROM THE TRANSFORMER. (ON OLDER UNITS, **DISCONNECT** BOTH SPADE CONNECTORS FROM TERMINALS ON THE TRANSFORMER.) **CUT** WIRE TIE AND **PULL** LAMP LEADS THROUGH THE CUT OUT IN THE FAN BAFFLE.

G **4. ATTACH REPLACEMENT LAMP HOLDER TO LAMP BRACKET.**
APPLY LOCKTITE TO BOTH 4-40 X 3/8" PHILLIPS HEAD BOLTS. **INSTALL AND TIGHTEN** BOTH FASTENERS TO SECURE LAMP HOLDER TO THE LAMP BRACKET. **RESTORE** WIRING CONNECTIONS PER ASSEMBLY DRAWING.

G **5. INSTALL COVER OF UNIT.**
FOLLOW INSTRUCTIONS IN SECTION **B.2-4 PG 7** TO ATTACH THE COVER TO THE LX-150.

G **LAMP HOLDER R & R CONTINUED.....**

G **5. TEST TO VERIFY SAFE OPERATION.**
CONNECT LX-150 TO POWER SOURCE AND **TURN ON AND CHECK** FOR LAMP OPERATION. **PERFORM** ALL TESTS.

T E C H N I C I A N N O T E S :

CAUTION: DISCONNECT LX-150 FROM POWER SOURCE BEFORE SERVICING.

H LAMP HOLDER / HEAT SINK ASSEMBLY R & R

H **1. REMOVE COVER.**

DISCONNECT LX-150 FROM POWER SOURCE.
FOLLOW INSTRUCTIONS IN SECT **B.2-1 PG. 7** TO REMOVE COVER FROM UNIT.

H **2. REMOVE OLD ASSEMBLY FROM UNIT.**

NEW UNITS :
FOLLOW INSTRUCTIONS FOR FAN REMOVAL IN SECTION **F PG 11** AND **REMOVE** FAN FROM CHASSIS. **PLACE** FAN OUT OF THE WAY. **REMOVE** THREE ALLEN SCREWS FROM THE BEZEL (**USE 1/16" HEX KEY). REMOVE** LAMP HOLDER / HEAT SINK ASSEMBLY.
OLD UNITS :
FOLLOW INSTRUCTIONS FOR FAN REMOVAL IN SECTION **F PG 11** AND **REMOVE** FAN FROM CHASSIS. **PLACE** FAN OUT OF THE WAY. **REMOVE** THREE ALLEN SCREWS FROM THE BEZEL (**USE 1/16" HEX KEY).**

H **3. INSTALL REPLACEMENT LAMP HOLDER / HEAT SINK ASSEMBLY.**

POSITION NEW ASSEMBLY IN CHASSIS WITH THE TEFLON SPACER IN PLACE BETWEEN THE INSIDE SURFACE OF THE FRONT PANEL AND THE HEAT SINK. **POSITION** THE SHUTTER OVER THE PEG ON THE SHUTTER CRANK BUSHING. **TURN** THE BRIGHTNESS KNOB TO CHECK OPERATION OF THE SHUTTER. **ATTACH** THE LAMP HOLDER HEAT SINK ASSEMBLY TO THE UNIT WITH THE THREE ALLEN KEYS. **USE** 1/16" HEX KEY.

H **4. RESTORE ELECTRICAL CONNECTIONS.**

NEW UNITS:
SLIDE A PIECE OF HEAT SHRINK OVER THE WIRES YOU ARE ABOUT TO CONNECT WITH A BUTT CONNECTOR.
CONNECT LAMP HOLDER WIRE TO WIRE COMING FROM THERMAL PROTECTOR USING BUTT SPLICE CONNECTOR AS SHOWN IN ASSEMBLY DRAWING. **COVER** BUTT CONNECTOR WITH HEAT SHRINK. **ATTACH** OTHER LEAD TO TRANSFORMER USING SPADE CONNECTOR AS SHOWN IN ASSEMBLY DRAWING. **INSTALL** FAN PER SECT **F PG 11.**
OLD UNITS:
CONNECT SPADE CONNECTORS TO TRANSFORMER TERMINALS PER ASSEMBLY DRAWING. **INSTALL** FAN PER SECT **F PG 11.**

H **5. INSTALL COVER OF UNIT.**

FOLLOW INSTRUCTIONS IN SECTION **B.2-4 PG 7** TO ATTACH THE COVER TO THE LX-150.

H **6. TEST TO VERIFY SAFE OPERATION.**

CONNECT LX-150 TO POWER SOURCE AND **TURN ON AND CHECK** FOR LAMP OPERATION. **PERFORM** ALL TESTS.

CAUTION: DISCONNECT LX-150 FROM POWER SOURCE BEFORE SERVICING.

I AIR PUMP PN451531 R & R.

I 1. REMOVE COVER.

DISCONNECT LX-150 FROM POWER SOURCE.
FOLLOW INSTRUCTIONS IN SECT **B.2-1 PG. 7** TO REMOVE COVER FROM UNIT.

I 2. REMOVE OLD AIR PUMP FROM BAFFLE.

STAND THE LX-150 ON ITS BACK TO FACILITATE PUMP REMOVAL. THE FAN MUST BE UNFASTENED AND MOVED OUT OF THE WAY TO REMOVE TWO OF THE AIR PUMP SCREWS. **FOLLOW** INSTRUCTIONS FOR FAN REMOVAL IN SECTION **F PG 11 BUT DO NOT CUT OR DISCONNECT FAN WIRES. MOVE** FAN ENOUGH TO GAIN ACCESS TO TWO PUMP FASTENERS. **CUT** WIRE TIES HOLDING THE PUMP WIRES IN PLACE. **REMOVE** THE FOUR PUMP MOUNTING NUTS (4-40 HEX NUT). **USE** 1/4" OPEN END WRENCH TO LOOSEN THEM. THEN **SPIN** THEM OFF WITH A FINGER. WHEN ALL FOUR NUTS ARE REMOVED, THE PUMP WILL FALL AWAY FROM THE BAFFLE. **DISCONNECT** THE AIR LINE FROM THE PANEL MOUNT CONNECTOR. **REMOVE** PUMP FROM LX-150.

I 3. INSTALL REPLACEMENT AIR PUMP* / BAFFLE ASSEMBLY.

***NOTE:** THE ENOMOTO MODEL MV-610 IS AN ELECTROMAGNETIC VIBRATOR PUMP. **IT IS NOT REPAIRABLE.** IT CONTAINS 2 SEPARATE BELLOWS PUMPS WHICH ARE EACH DRIVEN BY THEIR RESPECTIVE PERMANENT MAGNET ARMATURES. ELECTROMAGNETISM ALTERNATELY PULLS THE ARMATURE PERMANENT MAGNETS BETWEEN THE TWO ELECTROMAGNET POLES AT LINE VOLTAGE FREQUENCY (CPS). THE VIBRATING ARMATURES COMPRESS THE TWO FLEXIBLE BELLOWS. EACH BELLOWS HAS AN INTAKE AND AN EXHAUST PORT. AIR IS ADMITTED TO THE BELLOWS THROUGH AN INTAKE CHECK VALVE. AIR LEAVES THROUGH THE EXHAUST CHECK VALVE. **SEE FIG. I-1.** THE OUTPUT (EXHAUST) OF THE FIRST BELLOWS IS FED INTO THE INTAKE OF THE SECOND BELLOWS VIA A SHORT CONNECTOR TUBE. THE OUTPUT OF THE SECOND BELLOWS IS FED TO THE PANEL MOUNT CONNECTOR. THE ENOMOTO MV-610 PUMP GENERATES BETWEEN 258 AND 361.2 mmHG (6.6 PSIG) AT A FLOW RATE OF 7.2 L/MIN.. THE EXTERNAL LOOP OF TUBING CONNECTS THE TWO BELLOWS AND MUST BE SECURELY CONNECTED TO THE CORRECT PORTS AS SHOWN IN FIG. I-1. IF THE CONNECTOR TUBING IS LOOSE, MISSING, OR ON THE WRONG NIPPLE, THE PUMP **WILL NOT MEET** SPECIFICATIONS.

CRIMP ON SPADE CONNECTORS IF PUMP DOES NOT HAVE THEM.
CHECK THE ROUTING OF ALL PUMP CONNECTOR TUBING.
CONNECT THE AIR OUTPUT TUBING SECURELY BETWEEN THE MV-610 OUTPUT AND THE PANEL MOUNT CONNECTOR. TUBES MUST BE FREE OF CUTS, SHARP BENDS OR 'KINKS'. **POSITION** NEW PUMP ON BAFFLE WITH THE WIRE LEADS ON TOP AND THE PUMP OUTPUT TUBE ON THE BOTTOM. **INSTALL** ALL ORIGINAL VIBRATION ISOLATION GROMMETS AND PLASTIC WASHERS. **FASTEN** PUMP TO BAFFLE WITH NUTS AND BOLTS PROVIDED. (EARLY MODELS HAVE A "T" IN THE OUTPUT LINE TO THE PANEL MOUNT CONNECTOR.

TUBING ARRANGEMENT FOR THE ENOMOTO MV-610 PUMP
CONTAINED IN THE LX-150 LIGHT SOURCE

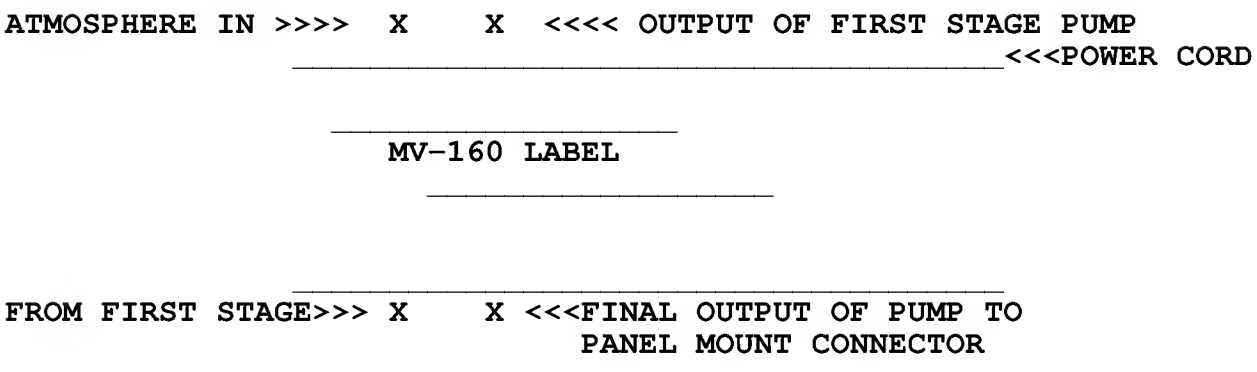


FIGURE I - 1

CAUTION: DISCONNECT LX-150 FROM POWER SOURCE BEFORE SERVICING.

I AIR PUMP PN451531 R & R CONTINUED.....

THE PURPOSE OF THE "T" WAS TO PROVIDE A BLEED-OFF ORIFICE TO LIMIT PUMP OUTPUT PRESSURE IF THAT PARTICULAR PUMP HAD TOO MUCH OUTPUT PRESSURE. THE "T" WAS PLUGGED OFF IF THE PUMP WAS ALREADY AT THE REQUIRED PRESSURE LIMIT. THEREFORE **DO NOT REMOVE** THE **"T"** IF THE LX-150 EARLY MODEL IS SO EQUIPPED.)

I **4. RESTORE ELECTRICAL CONNECTIONS.**

(THE ELECTRICAL CONNECTIONS DIFFER SLIGHTLY BETWEEN OLDER AND NEWER MODELS IN THAT ONE PUMP LEAD IS CONNECTED TO A TERMINAL STRIP ON OLDER MODELS. PUMP LEAD ON NEWER MODELS IS CONNECTED DIRECTLY TO THE TRANSFORMER VIA A SPADE CONNECTOR.)

NEW UNITS:

CONNECT LEADS TO TRANSFORMER AND AIR SWITCH USING SPADE CONNECTORS AS SHOWN IN ASSEMBLY DRAWING. **INSTALL** FAN PER SECT **F PG 11.**

OLD UNITS:

CONNECT ONE PUMP LEAD SPADE CONNECTOR TO AIR SWITCH AND THE OTHER LEAD TO THE TERMINAL STRIP PER ASSEMBLY DRAWING. **INSTALL** FAN PER SECT **F PG 11.**

I **5. INSTALL COVER ON UNIT.**

FOLLOW INSTRUCTIONS IN SECTION **B.2-4 PG 7** TO ATTACH THE COVER TO THE LX-150.

I **6. TEST TO VERIFY SAFE OPERATION.**

CONNECT LX-150 TO POWER SOURCE AND **TURN ON** AND **CHECK** FOR CORRECT PUMP OPERATION. **PERFORM** ALL TESTS.

T E C H N I C I A N N O T E S :

CAUTION: DISCONNECT LX-150 FROM POWER SOURCE BEFORE SERVICING.

J **TRANSFORMER R & R.**

J **1. REMOVE COVER.**
DISCONNECT LX-150 FROM POWER SOURCE.
FOLLOW INSTRUCTIONS IN SECT **B.2-1 PG. 7** TO REMOVE COVER FROM UNIT.

J **2. REMOVE OLD TRANSFORMER FROM UNIT.**
REMOVE WIRE CONNECTORS FROM TRANSFORMER. **REMOVE** HOLD DOWN FASTENERS (TWO PHILLIPS SCREWS FOR NEW UNITS AND TWO 1/4" HEX HEAD SCREWS AND TWO PHILLIPS HEAD SCREWS FOR OLD UNITS). **REMOVE** TRANSFORMER FROM CHASSIS.

J **3. INSTALL REPLACEMENT TRANSFORMER.**
CHECK INTEGRITY OF JUMPER WIRES ON NEWER STYLE UNIT TRANSFORMERS BY **PULLING** LIGHTLY ON JUMPERS WITH PLIERS. **BE CAREFUL** THAT YOU DO NOT CUT INSULATION. **REJECT** ANY TRANSFORMERS WITH LOOSE OR BROKEN SOLDER JOINTS.
NEWER STYLE:
POSITION TRANSFORMER WITH TERMINALS TOWARDS REAR OF UNIT. **PLACE** TRANSFORMER FEET UNDER RAISED PUNCH OUT ON CHASSIS AND **SECURE** OTHER TWO FEET WITH SCREWS.
OLDER STYLE:
POSITION TRANSFORMER WITH TERMINALS TOWARDS REAR OF UNIT. **PLACE** TRANSFORMER FEET OVER THREADED HOLES IN CHASSIS AND **SECURE** WITH TWO 1/4" HEX HEAD SCREWS AT THE REAR OF THE TRANSFORMER AND TWO PHILLIPS HEAD SCREWS AT THE FRONT FEET OF THE TRANSFORMER.

J **4. RESTORE ELECTRICAL CONNECTIONS.**
CONNECT WIRING SPADE CONNECTORS TO TRANSFORMER TERMINALS AS SHOWN IN ASSEMBLY DRAWING.

J **5. INSTALL COVER OF UNIT.**
FOLLOW INSTRUCTIONS IN SECTION **B.2-4 PG 7** TO ATTACH THE COVER TO THE LX-150.

J **6. TEST TO VERIFY SAFE OPERATION.**
CONNECT LX-150 TO POWER SOURCE AND **TURN ON AND CHECK** FOR OPERATION OF ALL COMPONENTS. **PERFORM** ALL TESTS.

T E C H N I C I A N N O T E S :

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CAUTION: DISCONNECT LX-150 FROM POWER SOURCE BEFORE SERVICING.

K **INTERLOCK SWITCH R & R.**

NOTE: INTERLOCK SWITCH PN451562 MUST HAVE WIRING CONNECTED TO THE NORMALLY OPEN CONTACTS (COMMON TERMINAL ON TOP OF THE SWITCH AND TERMINAL LABELED #2). THIS WIRING ARRANGEMENT WILL ENSURE THAT THE SWITCH WILL BE CLOSED WHEN THE LAMP ACCESS DOOR IS SHUT AND THAT THE SWITCH WILL "OPEN" WHEN THE DOOR IS OPENED. **DO NOT USE CENTER TERMINAL OF INTERLOCK SWITCH.**

K **1. REMOVE COVER.**
DISCONNECT LX-150 FROM POWER SOURCE.
FOLLOW INSTRUCTIONS IN SECT **B.2-1 PG. 7** TO REMOVE COVER FROM UNIT.

K **2. REMOVE OLD INTERLOCK SWITCH FROM CHASSIS.**
REMOVE TWO NUTS AND BOLTS. **USE** OFFSET PHILLIPS SCREWDRIVER OR PHILLIPS HEAD BIT IN RATCHET AND 1/4" OPEN END WRENCH. WHEN THE FASTENERS HAVE BEEN REMOVED, **LIFT** SWITCH UP AND AWAY FROM THE CHASSIS TO ENABLE YOU TO **PULL** SPADE CONNECTORS OFF OF SWITCH TERMINALS. (COMPARE THE POSITION OF EACH OF THE TWO WIRES WITH RESPECT TO WHAT THE ASSEMBLY DRAWING SHOWS. THERE SHOULD BE NO DISCREPANCY.) IF OLD INSULATOR REMAINS IN PLACE, **DO NOT REMOVE IT.**

K **3. INSTALL REPLACEMENT INTERLOCK SWITCH.**
CONNECT SPADE CONNECTORS TO REPLACEMENT SWITCH AS PER ASSEMBLY DRAWING. **FASTEN** REPLACEMENT SWITCH TO CHASSIS SO THAT THE INSULATOR IS BETWEEN THE SWITCH AND THE METAL CHASSIS. **UTILIZE** THE ORIGINAL FASTENERS AND LOCKTITE. **OPEN AND CLOSE** LAMP ACCESS DOOR TO VERIFY THAT THE ACTUATING PIN ON THE DOOR CONTACTS THE ACTUATING ARM OF THE SWITCH. **INSTALL** NEW WIRE TIES IF ANY HAVE BEEN REMOVED DURING DISASSEMBLY.

K **4. INSTALL COVER ON UNIT.**
FOLLOW INSTRUCTIONS IN SECTION **B.2-4 PG 7** TO ATTACH THE COVER TO THE LX-150.

K **5. TEST TO VERIFY SAFE OPERATION.**
CONNECT LX-150 TO POWER SOURCE AND **TURN ON AND CHECK** FOR OPERATION OF INTERLOCK SWITCH. **PERFORM** ALL TESTS.

T E C H N I C I A N N O T E S :

CAUTION: DISCONNECT LX-150 FROM POWER SOURCE BEFORE SERVICING.

L **SHUTTER ADJUSTMENT.**

L **1. INSPECT BRIGHTNESS CONTROL FUNCTION.**

GRASP BRIGHTNESS KNOB AND MOVE IN ALL DIRECTIONS TO DETECT LOOSENESS. **TIGHTEN** KNOB SET SCREW IF LOOSE.
USE A 1/8" FLAT BLADE SCREWDRIVER. IF SHAFT IS ROTATES AND THE SHUTTER DOES NOT OPERATE, THEN A BROKEN BUSHING PN451549 **OR** LOOSE SHUTTER CRANK MAY BE THE PROBLEM. TO INSPECT THESE TWO COMPONENTS, THE COVER MUST BE REMOVED.

L **2. REMOVE COVER.**

DISCONNECT LX-150 FROM POWER SOURCE.
FOLLOW INSTRUCTIONS IN SECT **B.2-1 PG. 7** TO REMOVE COVER FROM UNIT.

L **3. RESTORE OPERATION OF SHUTTER CAM.**

IF BUSHING IS INTACT, AND CAM IS LOOSE ON SHAFT, **TURN** BRIGHTNESS KNOB FULLY CLOCKWISE. THE SET SCREW IS NOW ACCESSIBLE NEAR THE AIR SWITCH. **TIGHTEN 4-40 X 1/4"** SET SCREW PN451519 IF LOOSE. **USE .050" HEX KEY.**
IF CUSTOMER COMPLAINT IS " KNOB RATTLES", **INSTALL** SPRING WASHER PN106142-1 UNDERNEATH THE SHUTTER CRANK.
REPLACE BUSHING IF BROKEN OR MISSING. **REMOVE** PIECES OF BROKEN BUSHING FROM CHASSIS BOTTOM.
MAKE SURE THAT THE BUSHING IS ON THE TOP OF ITS ARC OF MOVEMENT WHEN THE KNOB POINTS UP.

L **4. INSTALL COVER ON UNIT.**

FOLLOW INSTRUCTIONS IN SECTION **B.2-4 PG 7** TO ATTACH THE COVER TO THE LX-150.

L **5. TEST TO VERIFY SAFE OPERATION.**

CONNECT LX-150 TO POWER SOURCE AND **TURN ON AND CHECK** FOR OPERATION OF SHUTTER. **PERFORM** ALL TESTS.

T E C H N I C I A N N O T E S :

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APPENDIX AA

LX-150 WITH PARTS LEGEND
(DRAWINGS 451589 THREE SHEETS)

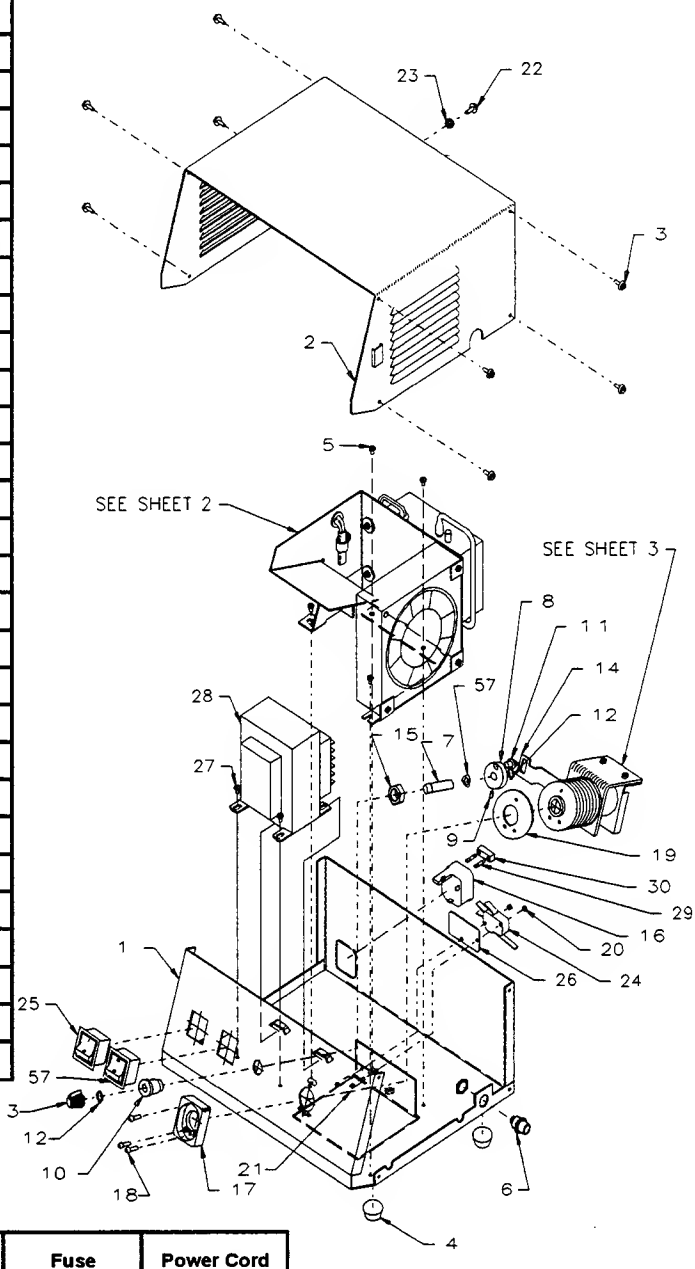
LX-150 Light Source

Introduced August, 1991

Nos. 45150, 45250 (After 8/91), 45160, 45262, 45264, 45266, & 45268

Sheet 1 of 3 (LIGHT BOX ASSEMBLY)

Ref.	Part No.	Description
2	441544	Cover
3	451565	Cover Screw (8)
4	451599	Foot (4)
5	713104	6-32 x 3/16 Screw (4)
6	451576	Panel Mount Connector
7	451615	Shutter Shaft
8	451518	Shutter Crank
9	451519	4-40 x 1/4 Set Screw
10	451548-1	Shaft Bearing
11	451549-1	Bushing
12	451542	Lock Ring (2)
13	451560	Knob
14	451546	Shutter
15	451543	1/2 - 20 Hex Nut
16	451559	Power Cord Receptacle
17	451501	Bezel
18	106138-1	Button Hd Screw (3)
19	451612	Spacer
20	790043	4-40 Hex Nut (2)
21	451563	4-40 x 5/8 Screw (2)
22	451582	6-32 x 1/4 Screw (Wht Hd)
23	451541	#6 Star Washer (2)
24	451562	Interlock Switch
25	451561	Power Switch
26	451539	Interlock Switch, Insulated
27	106100-14	8-32 x 3/8 Screw (2)
30	236733	Fuse Drawer
56	451614	Air Switch
57	106142-1	Spring Washer



Model Number	Chassis #1	Transformer Assembly #28	Fuse #29	Power Cord #31
45150	451545	451511	488307-7	761076-0
45250	451545	451511	488307-7	761076-0
45160	451606	451603	488307-6	N/A
45262	451606	451603	488307-6	761076-2
45264	451606	451603	488307-6	761076-4
45266	451606	451603	488307-6	761076-6
45268	451606	451603	488307-6	761076-8

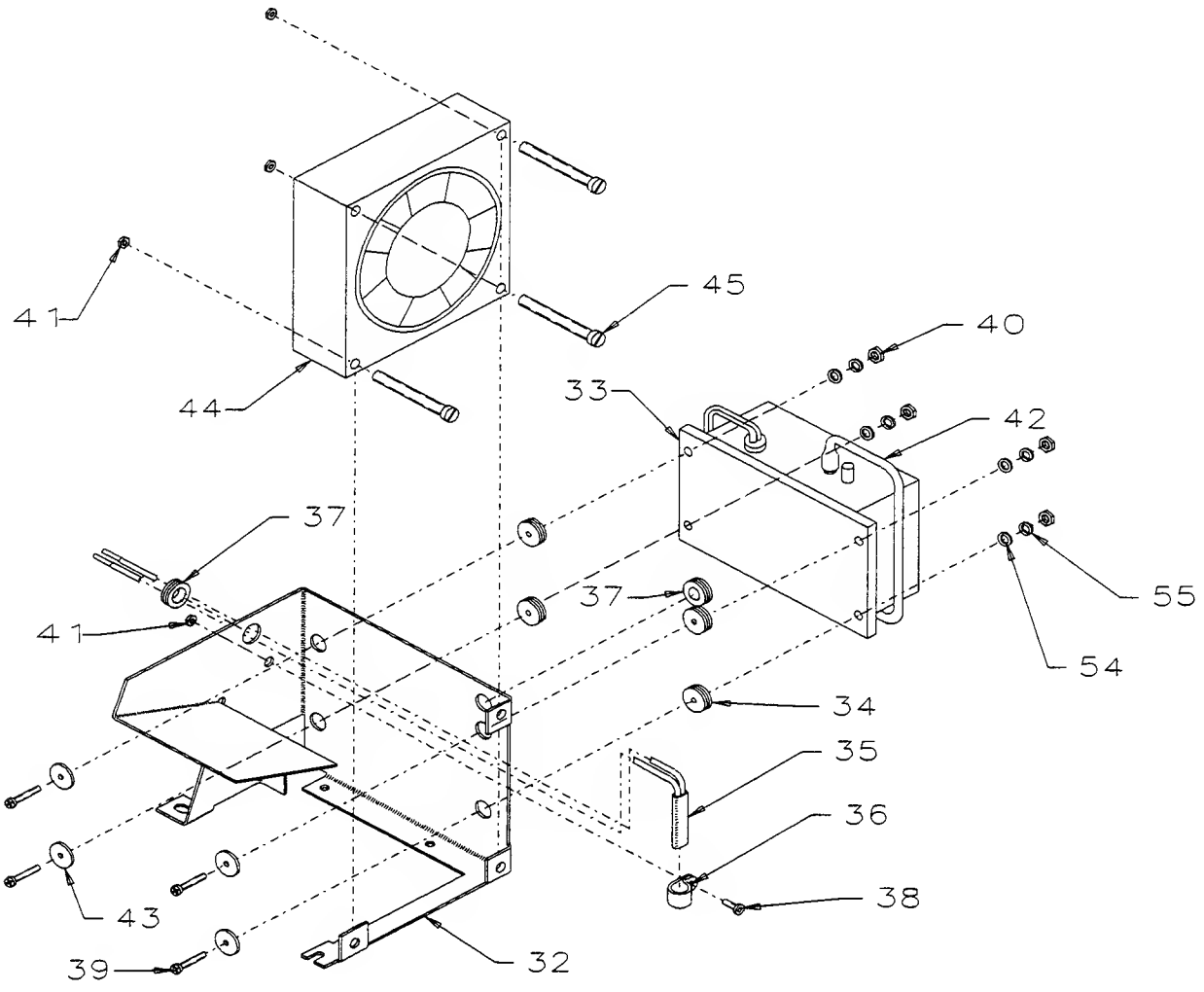
Reference Figure 451589, Repair BOM 45160 REPAIR, or appropriate Repair BOM

LX-150 Light Source

Introduced August, 1991

Nos. 45150, 45250 (after 8/91), 45160, 45262, 45264, 45266, & 45268

Sheet 2 of 3 (BAFFLE ASSEMBLY)



Ref.	Part No.	Description
32	451526	Baffle
33	451531	Air Pump
34	451521	Grommet (4)
35	451523	Thermal Protector
36	451529	Clamp
37	451522	Grommet (2)
38	106100-6	6-32 x 3/8 Screw
39	106100-3	4-40 x 2 Screw (4)

Ref.	Part No.	Description
40	790043	4-40 Hex Nut (4)
41	745075	6-32 Hex Nut (4)
42	339004-1	Tygon Tubing (8")
43	451524	Pump Retainer Washer (4)
44	451527	Fan
45	451528	6-32 x 1.75 SLTD HD Screw (3)
54	483104	#4 Flat Washer (4)
55	106105-3	#4 Lock Washer (4)

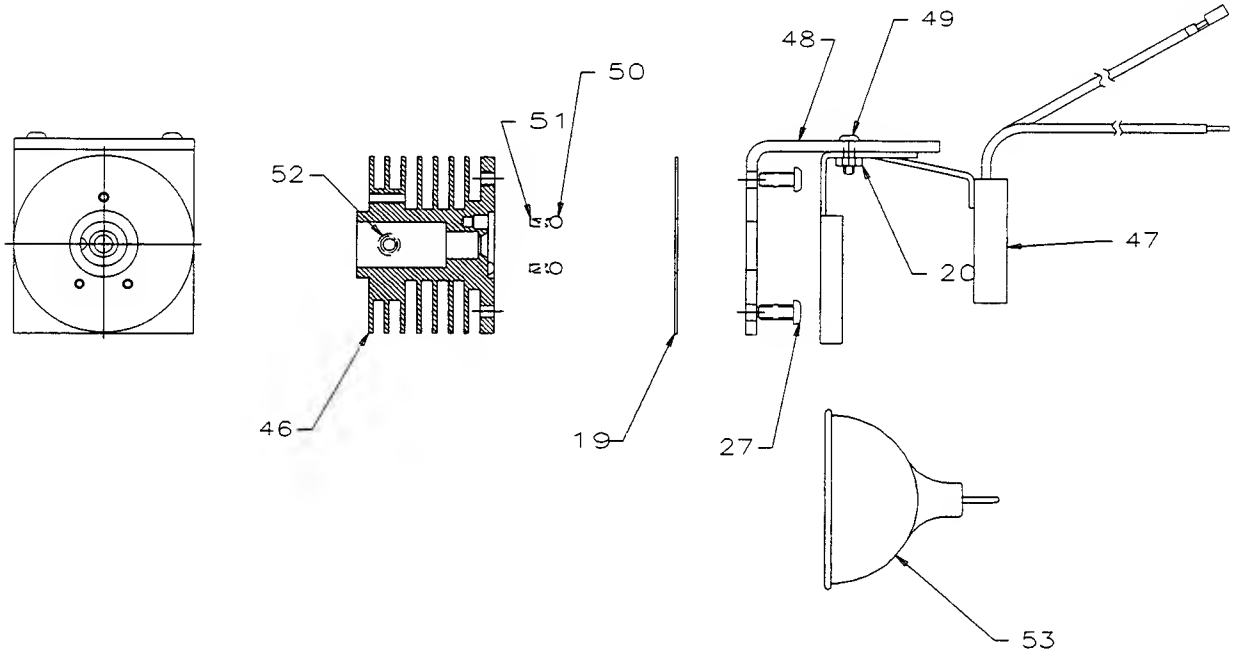
Reference Figure 451589, Repair BOM 45160 REPAIR, or appropriate Repair BOM

LX-150 Light Source

Introduced August, 1991

Nos. 45150, 45250 (After 8/91), 45160, 45264, 45266 &, 45268

Sheet 3 of 3 (LAMP HOLDER & HEAT SINK ASSEMBLY)



Ref.	Part No.	Description
19	451612	Spacer
20	790043	4-40 Hex Nuts (2)
27	106100-14	8-32 x 3/8 Screw (2)
46	451610	Heat Sink
47	451506	Lamp Holder
48	451611	Lamp Bracket
49	106100-4	4-40 x 3/8 Screw (2)
50	451510	Ball (2)
51	451507	Spring (2)
52	451577	Ball Plunger
53	04050	Lamp

Reference Figure 451589, Repair BOM 45160 REPAIR, or appropriate Repair BOM

APPENDIX BB

WIRING DIAGRAM/SCHEMATIC LX-150

CIRCUIT CONNECTIONS/ SCHEMATICS SHOWN ON DRAWINGS:
DOMESTIC..... 451535 AND 451536
INTERNATIONAL..... 451601 AND 451605

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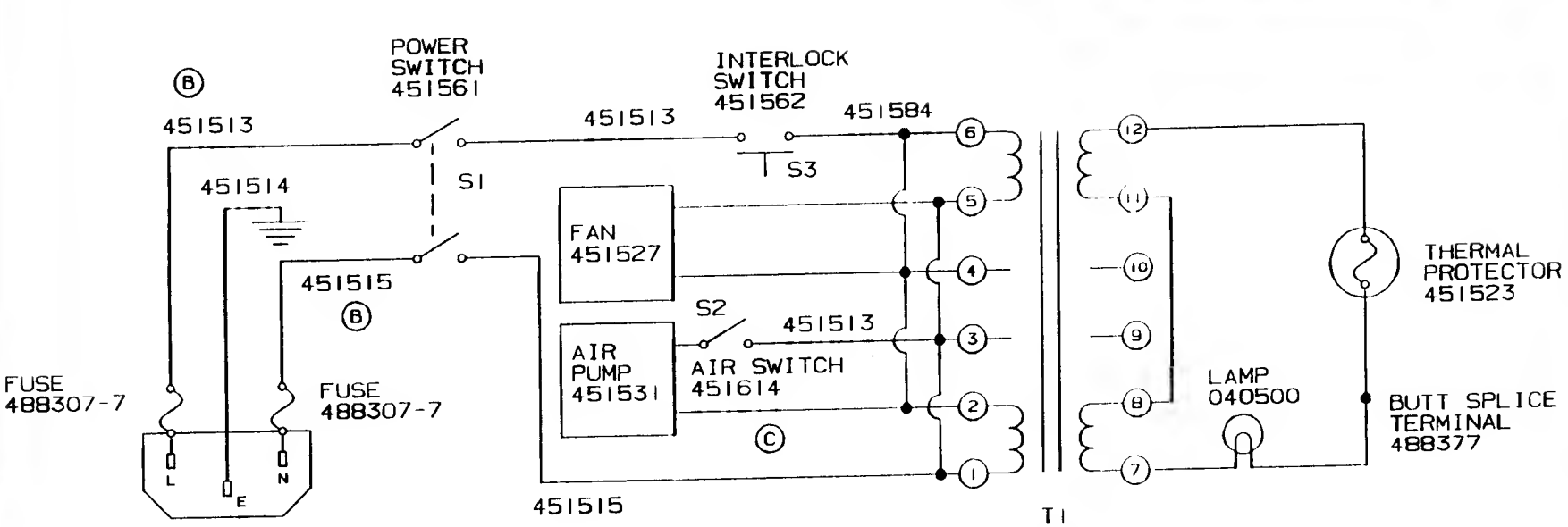
REV	DESCRIPTION	ECN	INIT	DATE	APPR
A	RELEASE TO PRODUCTION	5-22879	RLB	5-10-91	MDL
B	451513 WAS 451585 & 451515 WAS 451583	5-25120	RLB	10-16-92	MDL
C	451614 WAS 451561	5-26016	RLB	3-30-93	MDL



MATERIAL:	PART NO.		DESCRIPTION	
	DRAWN RLB	DATE 4-22-91	Welch Allyn	SKANEATELES FALLS, NEW YORK U.S.A.
FINISH:	DESIGNED RLB	7-31-89	TITLE: SCHEMATIC	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE PLATING -TOLERANCES- .XX =±.02 ANGLES: ±1/2° .XXX =±.005 TOLERANCES PER ANSI Y14.5 REMOVE BURRS & SHARP EDGES	CHECKED RGA/LAV	5-16-92		
	APPROVED MDL	5-14-91	CODE IDENT 64475 B	DRAWING NO. 451536 REV C
	REL TO PROD		SCALE NONE	DO NOT SCALE SHEET 1 OF 1

B 451536 0

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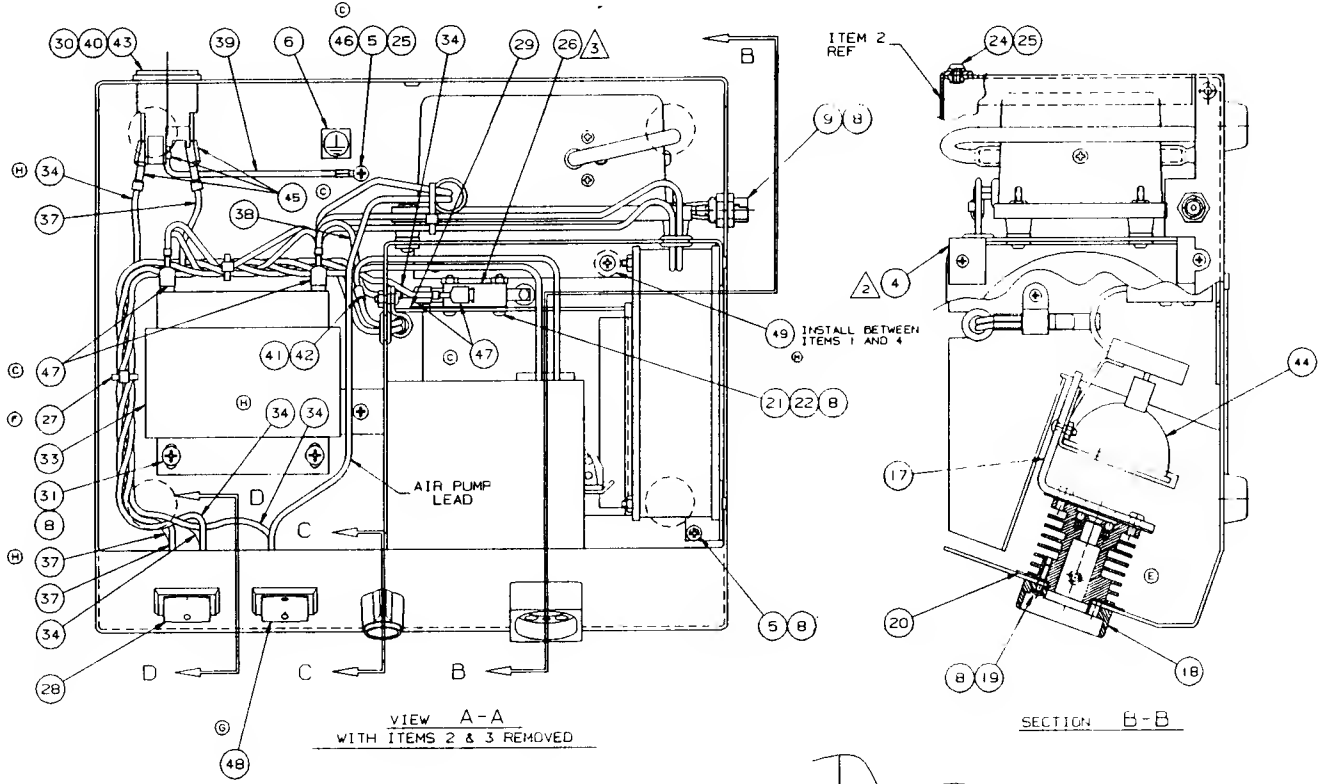
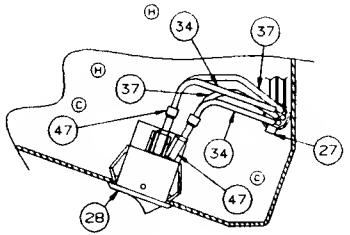
REV	DESCRIPTION	ECN	INIT	DATE	APPR
A	RELEASE TO PRODUCTION	S-22879	RLB	5-10-91	MDL
B	ADDED ITEM 44	S-22895	RLB	5-17-91	MDL
C	REMOVE ITEM 32 & ADD ITEMS 45, 46 & 47	S-23424	RLB	5-30-91	MDL
E	REVISED PICTURE OF HEATSINK	S-24804	RLB	7-2-91	MDL
F	REVISED PICTURE, REMOVED TWO TIE WRAPS ITEM 27	S-24886	RLB	7-10-91	MDL
G	ADDED ITEM 48	S-25117	RLB	8-14-91	MDL
H	ITEM 34 WAS ITEM 36 ITEM 37 WAS ITEM 35	S-25120	RLB	8-16-91	MDL
J	ADD ITEM 49 & CHG PICTURE OF ITEM 10	S-25278	RLB	9-25-91	MDL
K	ADDED △6	S-26038	RLB	2-6-92	MDL
M	ADDED ITEM 49	S-32143	JAN	2-6-98	PJB

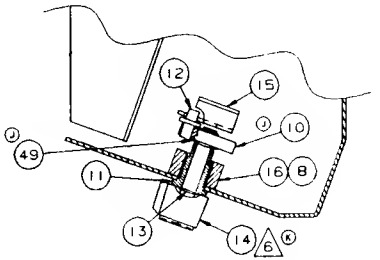


VIEW A-A
WITH ITEMS 2 & 3 REMOVED

SECTION B-B



SECTION D-D



SECTION C-C

MATERIAL:	PART NO		DESCRIPTION
	DRAWN R Bingham	DATE 5-7-90	Welch Allyn SKANEATELES FALLS, NEW YORK, U.S.A.
FINISH:	DESIGNED RLB	7-21-88	TITLE: LITE BOX ASSY
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE PLATING TOLERANCES: XX ±.02 ANGLES: ±1/2° .XXX ±.005	CHECKED LAV	5-17-91	
TOLERANCES PER ANSI Y14.5 REMOVE BURRS & BREAK EDGES EXTERNAL THDS= CLASS- 2A INTERNAL THDS= CLASS- 2B	APPROVED MDL	5-14-91	CODE IDENT 80278 D DRAWING NO. 451535 REV M
	REL TO PROD RDS	5-16-91	SCALE NONE DO NOT SCALE SHEET 2 of 2

D | 451535 SH 1 | P

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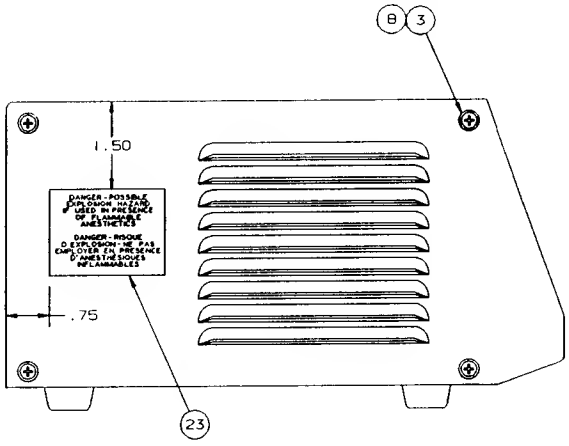
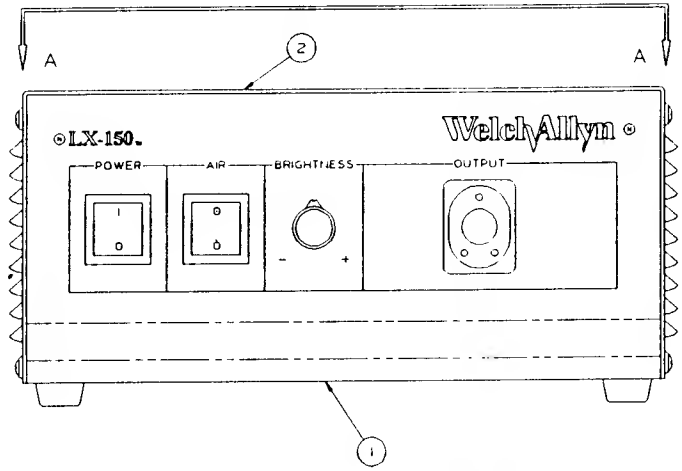
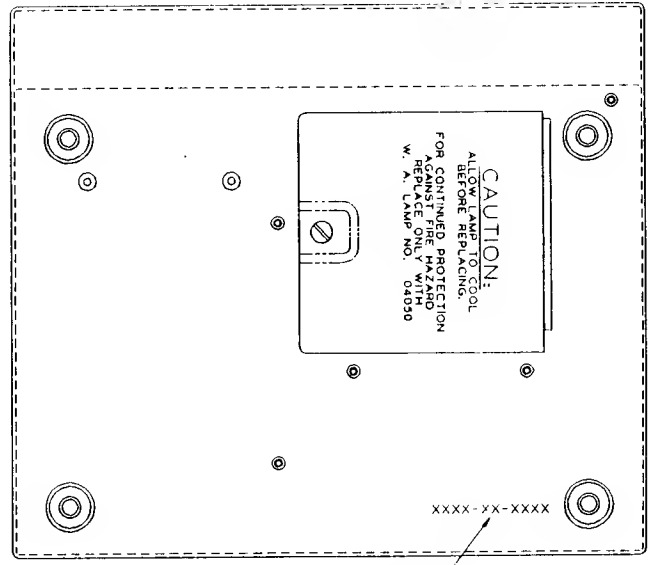


(SEE SHEET 2)




CAUTION:
ALLOW LAMP TO COOL BEFORE REPLACING.
FOR CONTINUED PROTECTION AGAINST FIRE REPLACE ONLY WITH W. A. LAMP NO. 04050
XXXX-XX-XXXX
5

NOTES:

Ⓓ 1. AFTER ASSEMBLY THIS UNIT MUST PASS
   A. GROUNDING CONTINUITY TEST A02242
   B. LEAKAGE CURRENT TEST A0017D
   C. DIELECTRIC STRENGTH TEST A00166

△2. WHEN ASSEMBLING ITEM 4 TO ITEM 1, TYGON TUBING ON ITEM 4 MUST NOT BE KINKED OR PINCHED.

△3. ITEM 26 (INTERLOCK SWITCH) MUST BE WIRED IN NORMALLY OPEN POSITION.

4. FOR WIRING DIAGRAM SEE SCHEMATIC

Ⓒ △5. DATE STAMP (PER SPEC A00198) MUST BE LOCATED IN SPACE SHOWN (EXAMPLE: JUNE 22, 1989).

Ⓚ △6. OPERATION OF BRIGHTNESS ACTION MUST NOT EXCEED A TORQUE OF 16 IN./OZ.

ⓅⓁ 7. LIGHT OUTPUT SHOULD BE BETWEEN 4400 AND 8400 FT. CANDLES.

REV	DESCRIPTION	ECN	INIT	DATE	APPR
A	RELEASE TO PRODUCTION	S-20872	RLB	6-19-89	MDL
B	ADDED ITEM 44 TO SHEET 2	S-22955	RLB	6-7-91	MDL
C	ADDED BOTTOM VIEW & NOTE 5 CHANGED SHEET 2	S-23424	RLB	6-27-91	MDL
D	NOTE 1 "A02242" WAS "A00172"	S-24451	RLB	8-8-91	MDL
E	REVISED PICTURE OF HEATSINK ON SHEET 2	S-24804	RLB	7-3-91	MDL
F	REVISED PICTURE OF TIE WRAPS ON SHEET 2	S-24855	RLB	7-15-91	MDL
G	REVISED PICTURE OF AIR PATH & ADDED ITEM 45 TO SHEET 2	S-25117	RLB	10-11-91	MDL
H	CHANGED ITEM 28 TO 31-0-8, ITEM 38 TO 31-0-4 SHEET 2	S-25120	RLB	9-10-91	MDL
J	ON SHEET 2 ADDED ITEM NO.4 CHANGED PICTURE OF ITEM 10	S-25278	RLB	11/20/91	MDL
K	ADDED NOTE 8	S-29038	RLB	9-10-92	MDL
L	ADDED NOTE 7	S-30195	JAN	3/26/93	PJB
M	ADDED ITEM 49 TO SH 2	S-32143	JAN	2/8/93	PJB
N	UPDATED FRONT PANEL ARTWORK	S-32903	JAN	6/12/93	PJB
P	REV'D NOTE 7	S-33042	JAN	6/30/93	SGS

MATERIAL	ITEM NO	PART NO	QTY	DESCRIPTION
FINISH	DRAWN	R.Bingham	DATE 5-7-90	Welch Allyn, Skaneateles Falls, New York U.S.A.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE PLATING TOLERANCES: XX ±0.02, XXX ±0.005 TOLERANCES PER ANSI Y14.5 REMOVE BURRS & SHARP EDGES EXTERNAL THDS. CLASS: 2A INTERNAL THDS. CLASS: 2B	DESIGNED RLB		7-31-89	TITLE: LITE BOX ASSY
	CHECKED VAL		5-17-91	
	APPROVED MDL		5-16-91	CODE IDENT NO 04579 D DRAWING NO 451535 REV P
	REL TO PROD RDS		5-16-91	SCALE NONE DO NOT SCALE SHEET 1 of 2

APPENDIX CC

REPAIR VERIFICATION TEST PROCEDURES

NOTE: This product is designed and manufactured to strict specifications and safety regulations for medical products, and should be serviced only by Welch Allyn trained technicians.

Perform the following test procedures after repairs have been made and prior to returning the LX-150 to the customer:

SEE A02353 FOR COMPLETE PROCEDURE WHICH INCLUDES THE FOLLOWING:

DIELECTRIC STRENGTH TEST (HIPOT)	**A00166**
GROUNDING CONTINUITY TEST	**A00172**
LEAKAGE CURRENT TEST	**A00170**
LIGHT OUTPUT	
PUMP OUTPUT	
INTERLOCK SWITCH OPERATION	
SHUTTER OPERATION	
FAN OPERATION	

APPENDIX DD

SET-UP AND OPERATION

SEE ATTACHED : FX-100 FLEXIBLE SIGMOIDOSCOPE AND LX-150 LIGHT SOURCE OPERATING INSTRUCTIONS PN339001

LX-150 LIGHT SOURCE OPERATING INSTRUCTIONS:

DOMESTIC..... PN451502
INTERNATIONAL..... PN451602

APPENDIX EE

The following items or their equivalent are required for the complete repair and testing of the LX-150 Light Source:

COMMON TOOLS:

Item:	Description:	Catalog #:
1.	Screwdrivers: Crescent #2502 Phillips #2	
2.	Screwdrivers: Offset Phillips #1 , #2	
3.	Screwdrivers: Flat blade: 1/4", 1/8",1/16"	
4.	Screwdrivers: Offset flat blade	
5.	Nut drivers:5/16", 1/2"	
6.	Combination wrenches: 5/16",1/4",1/2",5/8"	
7.	Pliers, long nose: Xcelite 51CG *	cat. #51CG
8.	Pliers, crimping: Klein 1005 **	cat. #1005
9.	Wire cutter: Xcelite 107CG *	cat. #107CG
10.	Wire stripper: Xcelite 105SCG *	cat. #105SCG
11.	Hex keys 1/16" & .050" ** set	cat. #BLX12
12.	Volt-Ohm Meter (with input impedance above 1 megohm)BECKMAN 330***	cat. #330
13.	Alligator test leads kit***	cat.#TL246A
14.	Soldering iron:80W Ungar 3180 ***	cat. #3180
15.	Heat shrink heat gun.	

TOOLS VENDORS:

*	Cooper Tools, PO Box 728, Apex NC, 27502, (919)362-7510 catalog no. 55171
**	Contact East Inc., 335 Willow Street, North Andover, MA 01845-5995, 1993 General Catalog, (508)682-2000
***	Marshall Catalog Co., Toll Free 1(800)522-0084
	Nolan Supply, 115 Leo Ave., Syracuse, NY, (315)463-6241

TEST EQUIPMENT for 'A' Specs:

CONTACT WELCH ALLYN TECH.SERVICES FOR INFORMATION ON TEST EQUIPMENT

1. Dielectric strength tester: ASSOCIATED HY-POT, MODEL AR404AT. Associated Research Co., 905 Carriage Park Ave. Lake Bluff, Illinois, (312)295-3312
2. Power supply;DC output:Volts 0-10, Amps 0-10, Watts 0-100 KEPCO MSK-10-10M , Kepco Inc., 131-38 Sanford Ave., Flushing, NY, 11352, (718)461-7000
3. Current leakage tester circuit as described in A spec. (Must be used in conjunction with volt meter with an input impedance above 1 megohm: item #15 ABOVE
4. Illuminance meter: MINOLTA T-1, Item# 1519-206 Minolta Corp.,101 Williams Drive, Ramsey, NJ, (201)825-4000

APPENDIX FF

PRODUCT UP-DATES

FILE ALL UP-DATES IN THIS SECTION. MAKE THE APPROPRIATE CHANGES IN THE MANUAL PERTAINING TO THESE UP-DATES.

APPENDIX GG
PRODUCT DESCRIPTION
WELCH ALLYN LX-150 LIGHT SOURCE (domestic and international)

The LX-150 Light Source provides air, water, and light to a fiber optic sigmoidoscope such as the FX-100. The metal housing contains components such as transformer, fan, pump, light, switches, power cord receptacle / fuse assembly, and circuits. A fan cools the interior of the housing. **See** PN451502 instructions. The sigmoidoscope connects to the LX-150 as follows:

1. The umbilical plug of the FX-100 connects to front panel **"OUTPUT"** port on the LX-150.
2. The water bottle connector "Air Input Hose" connects to the right side panel CPC connector. This OUTPUT provides approximately 6 P.S.I.G. to the water bottle.
3. The scope connects to the water bottle via the dual lumen air/water line. It is color coded: White=Water, Green=Air.

WARNING::::THE 150 WATT HALOGEN LAMP EMITS INTENSE LIGHT. DO NOT LOOK DIRECTLY INTO THE LIGHT OUTPUT PORT LABELED "OUTPUT".

LIGHT is provided by a 150 watt halogen lamp. The operator turns the lamp ON and the continuous "ON" cooling fan by depressing the front panel mounted switch labeled **"POWER"**. The operator varies the light output by turning the front panel mounted knob labeled **"BRIGHTNESS"**. This knob is mechanically linked to a continuous diaphragm. A thermal protector (closed below 95 degrees C, 203 degrees F) is wired in series with the lamp. It automatically opens and thus disables the lamp when internal temperatures rise above 95 C. The switch will close, thus enabling lamp operation when temperatures fall below switch set point.

AIR PRESSURE is provided to the water bottle by an internal pump. The operator turns on the pump by depressing the front panel mounted switch labeled **"AIR"**. Air pressure is not adjustable and is approximately 6 P.S.I.G.. This air pressure is converted to either air or water at the sigmoidoscope when the sigmoidoscope operator uses the air/water button by covering it for air or depressing it fully for water while the pump is operating.

WARNING!
FULL LINE VOLTAGE WILL BE PRESENT WITHIN THE LX-150 HOUSING WHEN THE UNIT IS CONNECTED TO THE MAINS (EVEN IF THE LAMP DOOR IS OPEN). REFER TO SCHEMATIC 109P371 B SIZE. THE LX-150 MUST BE UNPLUGGED FROM POWER SOURCE B E F O R E OPENING THE LAMP ACCESS DOOR OR PERFORMING ANY SERVICE PROCEDURES OR INSPECTIONS.

Lamps are removed and replaced through the bottom lamp access door. **UNPLUG** the LX-150 before attempting to change the lamp.
A micro switch is mechanically actuated to interrupt voltage to the transformer primary winding. If the lamp access door is open or un-latched, a mechanically actuated micro switch 'opens' and disables Light Source operation...HOWEVER, primary circuits (most of the circuits) are still dangerous! Attempts to service a plugged in unit are dangerous. Fuses are mounted in the modular power cord receptacle for new units, and on an internal fuse block for earlier models.